Analysis of epigenetic modifications in neural stem cells from diabetic pregnancy

For PhD Qualifying Examination (PQE) "Oral Component" – Open Seminar

Abstract:

It has been well established that diabetes mellitus during pregnancy predisposes the fetus to both structural and functional defects in the developing brain. However, the exact mechanism underlying glucose-induced brain defects remains unknown. It is hypothesised that maternal diabetes alters the expression of microRNAs (miRNAs) targeting genes involved in neural stem cells (NSCs) specification thereby resulting in brain malformations.

In order to address this, embryonic NSCs from normal and diabetic pregnancy were isolated and cultured *in vitro.* miRNA expression profiling of NSCs revealed up-regulation of miR-30b targeting Sirt1 which is involved in NSC differentiation in NSCs from diabetic pregnancy when compared to normal. In addition, overexpression of miRNA-30b decreased the proliferation and altered lineage specification of NSCs. Similar results were observed when NSCs were subjected to siRNA-mediated knockdown of Sirt1. In conclusion, this study reveals that hyperglycaemia altered proliferation and cell fate choice between neurons and glia by altering specific miRNA expression. The altered miRNA expression appears to form a basis for neural tube defects observed in embryos of diabetic pregnancy.

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DEPARTMENT OF ANATOMY

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